COMPACT PARTIAL OXIDATION REACTOR ASSEMBLAGE WITH FAST START-UP CAPABILITY

ABSTRACT OF THE DISCLOSURE

A method for converting hydrocarbon fuels to hydrogen and carbon monoxide through catalytic partial oxidation is described. The process comprises a reactor containing both an electrically heated catalyst as a start-up device and novel-metal-washcoated metallic monolith catalysts and a heat exchanging device. The partial oxidation reaction becomes ignited in less than 1.5 minute when the gaseous hydrocarbon fuel and oxygen-containing gas mixture is in contact with an electrically heated catalyst. The reaction takes place over the metallic monolith catalyst washcoated with noble metal (typically Pd/alumina-cerium oxide). The near complete conversion of hydrocarbon fuels with high hydrogen and carbon monoxide selectivities is achieved by preheating the feed mixture heat-exchanged with hot product gas stream.